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Clemson University

THE

BOBBIN & BEAKER

STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

No. 1 WINTER ISSUE ☆ 1952-1953 Vol. 11

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THE

Bobbin and Beaker

Official Student Publication
Clemson Textile School

VOL. 11 WINTER 1952-1953 NO. 1

The Staff

THE COVER

Dr. A. N. J. Heyn is shown making adjustments on the X-Ray equipment which he uses in fiber research.

In This Issue

THE BOBBIN AND BEAKER. Organized in November, 1939, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge twice during the school year by students of the Clemson College School of Textiles.

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POLICY—

The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to necessarily represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles.

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Doing It Better

DR. HUGH M. BROWN
Dean of Textiles

A slogan in the U.S.D.A. Laboratory at Clemson reads, "The Fun of Living is in Attempting to Do Something Better." This slogan applies so well to things we are trying to do in the Textile School. We have developed nearly a score of devices for improving testing methods and processing machinery. We try to get the spirit and thrill of this work over to the students.

The textile industry offers so many challenges to do things better. A large number of problems are recognized and engage researchers efforts the world over. A few of the needed improvements are the following: a better opener for cotton; more even picker laps; better carding; an evenning device for sliver and roving; improved drafting methods; higher speed looms; radically better ways of putting in

filling, probably eliminating the use of the shuttle; better tension controls on slashers, looms and tricot machines.

In the testing field we need better lap meters, nep counting methods, better meters for measuring fiber length, strength, fineness and maturity.

There is a continuous search for more and better automatic controls for an ever greater number of textile processes.

At Clemson we are working on, or plan to work on, all of the above problems for the good of the industry, for better training of our students and for "fun of living."

CLEMSON PROFESSOR RETURNS

Mr. Evans A. LaRoche, Assistant Professor of Weaving has returned to Clemson after an absence of more than 2 years. Professor LaRoche left Clemson in September 1950 to do graduate work at the Georgia Institute of Technology, and received his M.S. in Textile Engineering in June, 1951.

Shortly after graduation from the Georgia Institute, he was recalled to active duty by the Army as 1st Lieutenant, Infantry, and assigned to the 82nd Airborne Division at Fort Bragg, N. C. Overseas orders were soon received and after a 30 day refresher course at the Infantry School, Fort Benning, Ga., and a 30 day leave, the lieutenant was on his way to the Far East.

Upon reaching Japan in early February 1952, Lieutenant LaRoche was assigned to the Far East Command Intelligence School for a 10 week course. In April, he attended a Clemson Alumni meeting held in Tokyo where he met Major and Mrs. Coakley (formerly at Clemson) and several other Clemson men. Upon completion of the course, he was assigned to the 3rd Infantry (Rock of the Marne) Division, and proceeded to Korea to join his unit in early May, 1952.

In Korea, Lt. LaRoche served with the 1st Battalion, 65th Infantry Regiment (Puerto Ricans) of the 3rd Division as a rifle platoon leader in Company B and as 1st Battalion Intelligence Officer. He left Korea in October 1952, and was separated from the service on November 8, 1952.

Since his return to Clemson, Professor LaRoche has been engaged in research work under the direction of Dr. H. M. Brown, Dean of the School of Textiles.

Industry's Part In Textile Undergraduate Education

The following is the speech presented by N. M. Mitchell, President, Barnes Textile Associates Inc., Boston, at the National Council of Textile School Deans Meetings in Boston on November 11, 1952.

The Textile Industry in the United States is reflecting the greatest advances of its entire history. A wide range of new inventions have brought about many revolutionary changes in manufacturing procedures. Engineered technological changes in methods are being successfully inaugurated throughout the industry. Newly developed synthetic commodities are being processed in place of cotton, silk and wool, with no seeming limitation to further developments in this direction. Labor management relations have undergone drastic changes and are still in continual flux, especially where organized labor is involved.

What is happening in the field of education for those interested in the textile industry? Are the rank and file of educators following the old procedures and curriculums? Are those serving as instructors keeping themselves abreast of the times in all of the various divisions of activities common to the textile industry?

Because of my having been found somewhat outspoken in regard to present day Textile College undergraduate education I was asked to elaborate on my opinions at the 1946 Fall meeting of the American Society of Mechanical Engineers held in this hotel (Hotel Statler). The meeting was attended by several Presidents and Deans of Textile Colleges and there were many undergraduates in attendance as well. While many of the educators present did not agree with all I had to say, they were obviously sympathetic to many of the points I brought out. There was also a general agreement that there was a great need for revision and improvement in textile education procedures but it was seemingly difficult to arrive at any mutually acceptable program to develop the needed changes.

Following my now being asked to again talk on this subject, I decided to re-read the paper which I had prepared for the October 1946 meeting in order to compare my curent thinking with my earlier expressions. In doing this I found practically all I had presented to be equally applicable today. I am referring to many of these points in this discussion.

In considering the subject of education and its use I quoted a statement which I think applies very directly to our subjest, namely, "Truth is revealed. It needs only to be practiced." In a sense this is the philosophy which underlies all forms of education. It expresses the feeling of interdependence which exists between qualified teachers and students, in this instance between the textile college and its faculty, and the students and their careers.

I also made reference to a statement attributed to Edward Gibbons, "Education is a harmonious development of all of our faculties. It begins in the nursery and goes on at school, but does not end there. It goes through life whether we will or not. Every person has two educations, one which he receives from others and one more important, which he gives himself."

The interdependence of the educator and the student as I see it, is a reflection of the confidence which each has with the other. A leader, or instructor must not only know what he is talking about, but he must know how to pass his knowledge on to others. Both elements are equally important. In considering this angle of current conditions, the question can be asked, are present day courses of instruction built around commodities, machinery and methods commonly used in the various branches of the textile industry today? If these are answered in the negative, steps must be taken to correct the deficiencies.

In considering the subject of textile college education it would be interesting to note and analyze the answers to the following questions.

1. What does the student hope to achieve as a result of his successful graduation from the textile college he selects?
2. What does the college faculty set as it goal in planning and supervising the students education?
3. What type or form of education does the textile executive consider will best equip college graduates to properly qualify themselves for service in the industry?
4. Do the rank and file of mill executives want graduates who have specialized or do they consider a general all around education as best?
5. If the latter is desired, what does the classification "general" embrace?

These and many other questions can be asked in the interest of clarifying the thinking of college faculties, student and those who hire the graduates for replacement in the industry.

My own opinions in regard to the subject of textile education are based on experience as a practical mill executive combined with that obtained from several years as a practicing consulting engineer. Over this range of experience I have been active in selecting, placing and helping to train many young men, with and without college educations. My review of these experiences, unfortunately, does not summarize to the fullest credit of the textile college graduates to the extent which should be anticipated. The opinion is formed however that a much fuller realization of anticipations could be attained if the college curriculums were to be regularly adjusted to meet the progressive changes which are always taking place in the industry.

The textile industry embraces the processing of several different basic raw materials. The major divisions in the industry are:

1. Cotton
2. Wool
3. Silk
4. Jute, flax and other grass fibres.

The advent of synthetic fibres has actually revolutioned the industry and brought about consolidations of all fibres into integrated units of production. The college faculties, students and mill executives must give first consideration to all of these divisions of activity.

Each of the indicated commodity divisions are further divided into two general classifications, namely,

1. Manufacturing, and
2. Selling or distribution.

Here again these divisions must be recognized by faculty, student and mill executive.

The division of manufacturing, from an education standpoint, either general or selective must be divided into still finer classifications. Manufacturing operations embrace:

1. Administration
2. Finance
3. Accounting
4. Production engineering
5. Personnel engineering
6. Chemical or physical laboratory engineering
7. Mechanical engineering,

and many other equally important and distinctive divisions of work.

Selling or distribution must also be broken into many channels which call for specialized consideration, especially from the standpoint of education.

On the basis of the premise that textile college education must cover all of the indicated phases of manufacturing and selling it is obvious that the development of a curriculum of this scope will call for close collaboration between the textile colleges and the textile industry as a whole. In view of the fact that the textile manufacturer has the greatest stake in the project of the undergraduate training, he should and unquestionably would assist the colleges in every way possible.

As I stated in my earlier talk on this subject, I feel confident that it would be possible to organize a group representative of the best executives and engineering minds in the textile industry to work with instructors selected from the faculties of the textile colleges in the redevelopment of present courses of study, modernizing them to meet current requirements.

I firmly believe that the only possible way these needed changes in educational methods can be developed is through the courageous unified action of small groups who are intelligently and sincerely interested in such a program.

The textile industry seemingly demands broader and more complex schooling of personnel than do other industries. For that particular reason a textile college graduate often receives an education which is limited to fundamentals in a large number of processes and divisions of industrial activity.

Again, as I indicated in my first paper, the record clearly points out the fact that the textile colleges throughout the country have graduated a large number of men into the industry. A large percentage of the country's most able textile executives and technicians are textile college graduates, but it is also generally recognized in the industry by both non-graduates and graduates of textile colleges, that more specific treatment of undergraduate education has become necessary in order to meet the drastic changes which are taking place in industrial activity.

As stated, a surprisingly large number of textile college graduates have stuck to the industry, but a brief survey has disclosed the fact that there are but a relatively small number who are now engaged in work which is directly associated with the subjects studied.

Today, as before, I am hopeful that this treatment of the subject and the discussions which will follow,

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FIBER RESEARCH AT CLEMSON

By R. R. Fowler, TM '53

Dr. Heyn has been a professor of Natural and Synthetic Fibers for about five years at Clemson College in the School of Textiles. He was educated in Holland and received his Ph.D., from the University of Utrecht; he also studied at the Technical University in Delft, Holland. After receiving his Ph.D., he continued his studies with a fellowship of the Rockefeller Foundation in Paris (Sorbonne and other institutions), and in the Textile Physics Laboratory of the University of Leeds, England. From 1936, he was in charge of fiber textile research for the Netherlands Government in the Dutch East Indies. After the war he was sent on a scientific mission to several countries, including England, Australia and the United States. After this mission was completed he accepted his present position at Clemson College.

The textile field in which Dr. Heyn has specialized may be called "**Fiber Science**" and covers the production, preparation, properties, utilization and economy of both natural and synthetic fibers. With regard to the natural fibers this includes the agriculture and botany of the plants producing the fibers, the preparation of the fiber from the plant and with regard to the synthetic fibers and their manufacturing processes.

The study of fibers has many facets and can be approached from chemical, physical, botanical, microbiological, and many other angles. All these various aspects are discussed in the fiber courses given by Dr. Heyn and are represented by the lines of research in his laboratory. Some of these lines will be briefly mentioned here.

In the field of **Physical research,** one of the branches that Dr. Heyn has specialized in is the study of fibers by **X-ray diffraction.** This method gives information about the molecular structure of the fiber; namely, the type of molecules which compose the fiber and their arrangement of configuration in the fiber. This molecular structure is the basis of most of the physical properties of the fiber. When he started his work at Clemson the Kress Foundation furnished the funds for the purchase of an X-ray apparatus.

Two lines of research has been followed since; one, a systematic comparative study has been made of x-ray diffraction patterns of all natural and synthetic fibers. The results have been published in various articles and have been summarized for the synthetic fibers in a chapter on x-ray diffraction in **The American Handbook of Synthetic Fibers** which has just appeared, and for the natural fibers (together with synthetic fibers) in a chapter on this subject which will appear in the new 6th edition of the well known **Handbook of Textile Fibers by Mathews** which is now in press. This first line of x-ray research was carried out with the conventional technique giving information about the **molecular** structure.

The second line of x-ray research which was followed by Dr. Heyn has been the study of the scattering of x-rays at very small angles by textile fibers. This new method has been developed by him in Clemson College and proved extremely useful for the study of the microcrystallites or "micelles." Four publications appeared on this subject. The method has been very much refined recently by the introduction of the use of a Geiger counter and a special microdensitometer for more exact measurements of the scattered radiation. The Kress foundation again enabled the purchase of these instruments. With these instruments a systematic study of the small angle scattering by all different textile fibers is in progress.

In the field of **Chemical** research his work in Clemson has been concerned with the waxes of various vegetable fibers. It was found for the first time that the percentage of wax in cotton is not constant but depends on the maturity of the fiber. The results were published in two articles.

In the field of **Biochemistry** and **Microbiology** he recently published an extensive treatise on the retting process of hard fibers which deals with bacteriological decomposition of plant cell walls as a result of which the fibers are separated from the other tissue of the plant so that they can easily be extracted. This book was published in the transactions of the Royal Netherlands Academy of Science and discusses the results of some of his former work in the present Indonesia. The School of Textiles and the Kress Foundation gave a grant enabling the reproduction of a series of photomicrographs of the different bacteria involved for illustration of this publication.

The **Microscopy** of fibers is another subject. Dr. Heyn originally organized the Microscopy course which is now given by Assistant Professor J. C. Edwards. As there has been a serious need for a modern text book, Dr. Heyn recently has written a text on **Fiber Microscopy, a Textbook and Laboratory Manual** which is now in press. It includes the micro-

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The Textile Industry in Pakistan

By Rafique Saigol

One of the many reasons why the Moslem minority in pre-partioned India strove so feverishly to achieve independence was that they sought economic freedom from the moneyed Hindu clique that had, with encouragement from the British, monopolized every phase of business activity, except that which required actual manual labor — that was left to the Moslems. This is not a passionate plea for support, not an emotionally partisan viewpoint, but a cold, stark fact stated so that what follows will be better understood.

Once independence had become a reality after August 14, 1947, the Government of Pakistan was faced with three crucial problems, which stated in order of their importance were: Organization of the economic and political structure of the country; rehabilitation of the more than 8,000,000 stricken Moslem refugees, recently arrived from India to make Pakistan their homeland; and the gradual education of the only 13% literate population. Since, these five years have told a story of a people willing to work, of ceaseless effort and of unfaltering faith in themselves and in their leaders.

The people of Pakistan started off with a Homeland rich in potentiality but almost destitute of modern industry and lacking in trained personnel and skilled technicians. Of the great strides the subcontinent had made in a hundred years, Pakistan at Partition gained almost nothing. The great industries that India had developed were concentrated around Bombay and Calcutta and in the hinterland of these ports. The cotton grown in West Pakistan was spun in the mills of Bombay, and the jute grown in East Pakistan was processed in the jute mills of Calcutta.

Things are very different today. In East and West Pakistan the industries vital for her existence are already beginning to hum with activity, to rear against the sky-line in massive piles, and to galvanize with the transfusion of new blood, the muffled heart-beats of her industrial life.

In the textile industry the immediate progress is easy to record since the relative units are smaller, more compact and less tied up with ultimate long-term plans.

Jute: It had always been realized that the country should be able to put its "golden fiber" to industrial use in the shortest possible time. Out of this concept has emerged the Adamji Jute Mill in East Pakistan which stands foremost in the field where Government and private enterprise have joined hands. Three more mills, with 3000 looms in all at an estimated cost of 75 million rupees, are now being set up. The installation of the entire 1000 looms of the first mill have been completed and 500 looms have already gone into production. The entire project will be in operation by June 1953.

It is expected that another jute mill, in which the Government will again participate, will be set up shortly near Chalna in East Pakistan.

Cotton: The progress in the sphere of cotton textile industries has been most noteworthy. The original target of one million spindles fixed for the first five years by the First Industries Conference has subsequently been raised to 1.35 million spindles on the recommendation of the Textile Advisory Committee. Of this number 1,177,120 spindles have already been allocated and the bulk of the balance is expected to

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Eccentric Drive Gearing May Improve Loom Performance

By Dr. Hugh M. Brown, Dean

The following article was originated by Dr. Hugh M. Brown, Dean of Textiles at Clemson, and appeared in the October issue of Textile Industries Magazine.

The School of Textiles, Clemson Agricultural College, Clemson, S. C., has been experimenting for several months on the use of off-center gears for loom drives. The idea is to allot a greater part of the time of a crankshaft cycle to the movement from top center to bottom center than is allotted to movement from bottom center to top center.

In a standard loom drive the eccentricity of the lay and the design of the cam permit a slightly greater time for picking than for beating. The Clemson design maintains these features and, in addition, the use of eccentric gears greatly increases the percentage of the cycle for picking.

At Clemson the shafts of the crankshaft drive gears were moved just 8% off from center (about .4 in.), and this slight change allows 56% of the cycle for picking and 44% for beating-up. This relationship can be changed much more by increasing the eccentricity of the gears.

By giving a greater proportion of the time in a cycle to picking, the speed of the loom can be increased without the troubles usually encountered. For example, if a loom is now being run at 160 ppm, it can be speeded up to about 180 ppm, by the use of eccentric gears, without reducing the time allowed for picking. And it is this time allowed for the travel of the shuttle from box to box which largely determines the top operating speed of a loom, according to Clemson textile school officials.

The eccentric gearing arrangement, as installed on a loom at Clemson, permits an increase of about 12% in the speed of the loom without increasing the shuttle. Picking time is not reduced; it is the beating-up part of the cycle which has been speeded so as allow an increase in loom speed.

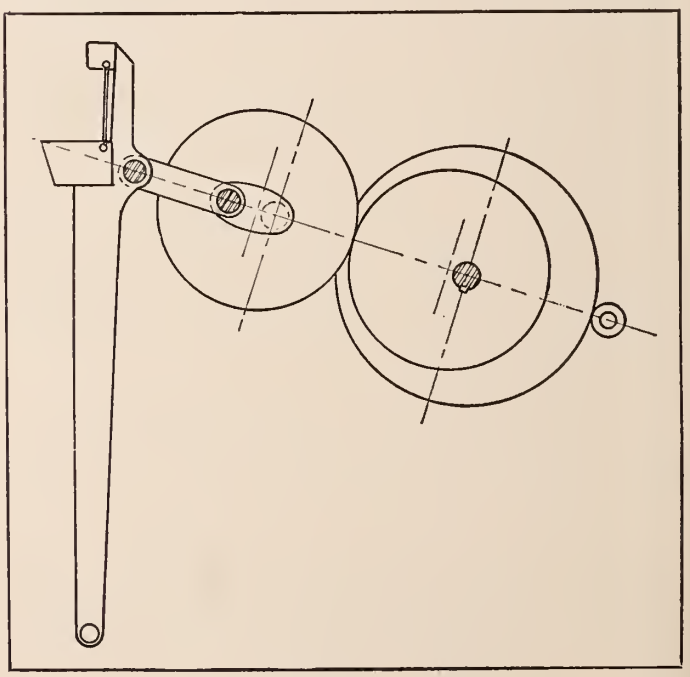
On the other hand, if these gears are used and the loom speed is kept the same, picking time is increased and the power required by the picker can be reduced proportionately.

While no mill tests have been made, results of the experiments in the laboratory indicate that eccentric gears make possible an increasing power to the picker and without any increase in maintenance.

There are still several points to be investigated. What effect will this type of drive have on the warp breakage? Will there be an increase or a decrease in loom vibration? These questions will be answered definitely only by mill testing, but indications are that results should be favorable.

Clemson is making plans to market, through some commercial organization, a kit which would supply all the parts needed to change any cam loom to this type of drive. It would include the two eccentric gears, a jack shaft and bearings, an extension for the motor, and two pick cams. The new drive could be installed in a few hours.

ECCENTRIC DRIVE arrangement between motor pinion and lay crank.



A Review of the Knitting Industry

By T. D. Efland

Assistant Professor of Knitting

Probably no one phase of the textile industry is as little appreciated by the average textile student as the field of knitting. While confronted on every hand by important contributions to human wearing apparel from the knitting machine, a majority are ignorant of the vast industry and highly technical processes that make possible knit garments. Knitting is a modern and progressive phase of the textile industry and one that is making new gains each year in the clothing market. It is a field that invites the attention of the young and adaptable mind which has been trained in the technical aspects of the textile industry.

The Knitting industry represents by employment approximately one-fifth of the U. S. textile industry with about one-quarter million of the nations' one and one quarter million textile workers. These workers are distributed among 3,000 plants ranging in size from those with less than a dozen employees to those which are manned by many hundreds of workers. Although there are many large plants in the industry, the competitive spirit of the Knitting industry derives from the high ratio of small producers. With but few exceptions the minimum economical operating unit is very low for Knit products.

Knit fabrics, while relatively new compared to the history of textiles, have been used for most items in wearing apparel. From the first conception of the knitted stitch some five hundred years ago it has been universally recognized that Hosiery could possess desirable qualities only by being knit. Thus the largest segment of the industry is devoted to the production of hosiery. More recently the trend to knit underwear has caused a growth of plants for their exclusive production. The fit, comfort, and serviceability of knit garments is giving rise to the increased use by every segment of the population with the trend being more pronounced in the infant's and children's field.

The advent of the high-speed tricot machine has caused a major change in the apparel for women in the present decade. The inherent qualities of tricot cloth combined with the qualities of acetate and nylon yarn have captured a majority of the lingerie field. Tricot production to date has hardly been sufficient to supply the lingerie market and consequently has had little opportunity to expand into other fields of apparel.

The latest survey shows 137 mills in the country operating 3,000 tricot machines. Of this number forty-four mills with 1,300 machines are located in the South East. Three of the newest and largest of these plants are in South Carolina. With the demand for tricot fabrics continuing to rise, most of the major Textile concerns have plans underway for tricot plants. The rate of growth in tricot has only been exceeded by that of the synthetic fiber industry in the postwar period and indications are that it will continue to boom for some time yet. This indication arises from the fact that a majority of tricot production to date has been plain Jersey fabric leaving an unlimited range of thousands of fabrics yet to be produced by the knitter and exploited by the designers.

An idea can be had of the size of the hosiery industry from the production figures for 1951. These figures show that approximately 617 seamless mills and 738 full-fashioned mills produced 103 million pairs of seamless hosiery for a total of 154 million dozen pair. This represents approximately one dozen pair for every man, woman, and child in the United States. It is interesting to note that the South produces 79.4% of all the seamless hosiery and 57.4% of full-fashioned hosiery made in this country. The increase in production in the South has risen steadily for the past decade and at present there is no end in sight.

The Knitting industry is characterized throughout by a high productivity per operator. The productivity arises from the high speed of the machines and the inherent qualities of knitted fabric. It has often been said that knitting is the cheapest way of converting yarn into fabric. Certainly the speed of the machines makes this true. There are knitting machines in production which will produce more than one hundred square yards of fabric per hour. With one operator to care for several machines the production per man hour is very high.

LINTHOUSE PERSONALITIES

By R. F. Compton, TM '54

PROFESSOR JOSEPH LINDSAY, JR.

Mr. Lindsay was born in Chester, South Carolina. He attended Chester High School, graduating in 1915. He then attended Erskine College where he played football with Dode Phillips. After his graduation in 1919 he returned to Erskine as coach. His best remembered football game was a 14 to 13 defeat of South Carolina in 1918.

Mr. Lindsay enlisted in the Army during World War I, and spent about six months in the service at college and in training at Plattsburg, New York.

He studied additional chemistry at the University of North Carolina and Chicago, later studying Textile Chemistry at Philadelphia Textile School. This was before southern colleges offered majors in this field.

Upon completion of his studies in Textile Chemistry, he worked for General Dyestuff Corporation in Charlotte as a technical trouble shooter and laboratory chief from 1926 until 1935 when he came to Clemson as head of the Textile Chemistry and Dyeing Department in 1935.

Mr. Lindsay attended summer sessions at the University of Tennessee from 1940 until 1945, receiving a Master of Science degree in 1945. During this same period, he spent half the summers as lecturer at the dyeing school for college graduates conducted by the Ciba Company in their headquarters in New York.

Mr. Lindsay is married and has one son who is a junior at Clemson. He is an Elder in the Presbyterian Church, a member of the Advisory Board of the Y.M.C.A., a national councilor for the American Association of Textile Chemistry and Colorists and is Chairman of the Student Award Committee of the A.A.T.C.

LETTER OF RECOGNITION

The following letter was received by Dr. Brown, Dean of the School of Textiles, from Mr. Hobart Souther who is Chairman of the Piedmont Section of A.A.T.C.C. The letter is very complimentary and should make all of us proud of our school.

Dear Dean Brown:

"I want to thank you very much for the wonderful hospitality extended the Piedmont Section, A.A.T.C.C., by you and your staff, students, and all our other gracious Clemson College hosts at our recent Spring Meeting at Clemson. Your welcome remarks contributed immensely to the enjoyment of the dinner meeting.

Everyone was amazed at the tremendous progress made by the Clemson School of Textiles, and in view of the fine papers presented by your students, you and Joe Lindsay, as well as Clemson College itself, can truly be proud of a most commendable contribution to the entire textile industry.

It has certainly made me feel happy to be told by so many members that our Clemson meeting was one of the finest we ever held in that section. This sentiment has led to suggestions from a large number of members to hold all our Greenville meetings at the Clemson House, which is another great compliment to Clemson College, as well as to those who joined with you in appearing on our program and contributing so much to its success."

Yours very sincerely,

Hobart Souther, Chairman
Piedmont Section, A.T.T.C.C.

DR. W. T. RAINEY, JR.

Mr. Rainey was born at Salisbury, North Carolina on September 1, 1919. He lived in Badin, North Carolina. He attended Fayetteville High School, graduating in 1935. From 1935-37 he attended Oak Ridge Military Academy, after which he attended Davidson College receiving his B.S. degree in Chemistry in 1939. After graduation, Mr. Rainey continued his study of Chemistry at the University of North Carolina Graduate School of Chemistry from 1939 until 1941. Later, he returned to Davidson College and taught Chemistry for one year. After this, he took a position as Research Chemist in the Chemical Warfare Department at the U. S. Naval Research Laboratory in Washington, D. C., where he worked from 1941-1943.

Mr. Rainey volunteered for the Navy in 1943 and received his basic training at Bainbridge, Maryland. Later, he went to Radio Technician Schools at Chicago, and from there to Del Monte, California and Treasure Island, California, where he served as an Instructor at the Radio Technician School. He was discharged in 1946 with the rank of Radio Technician Second Class.

After receiving his discharge, he returned to the University of North Carolina, receiving his Ph.D., in Chemistry in June 1949.

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Where Are They Now?

By R. R. Fowler, TM '53

Upon their graduation in February, thirty-one Clemson textile graduates will go into the textile world to pursue their ambitions in the field they have chosen. These new graduates are not likely to be among complete strangers, as they will probably meet old friends and classmates in any of the various textile concerns throughout the industry.

In the following paragraphs are listed a few Clemson graduates and the positions they now hold in the textile industry.

Now employed by Abney Mills are:

Carl W. Seigler '43, Assistant General Manager of the Anderson, Belton and Courtenay plants; Joe L. Burriss '29, Master Mechanic, Anderson plant; Keith Buchanan '49, Quality Control and Standards Department, Anderson plant; Ryan D. Mitchell '29, Night Overseer of Weaving, Belton plant; Luther B. Rentz '47, Recreation Director, Belton plant; Robert S. Davis '51, Supply Department Head, Brandon Mill; Claude D. Nalley '33, Superintendent, Poinsett Mill; James M. Cathcart, Jr., '32, Office Manager, and Miles Moss, '49, Paymaster and Shipping Clerk, Courtenay plant, Newry, S. C. Also E. W. Seigler, Sr., '49, Assistant to Vice President in charge of Production, Greenwood; Jesse Boyce, '46, Assistant Superintendent, Panola plant, Greenwood; Richard Hendrix '49, Assistant Card Room Overseer, and Brooks Patterson, '49, Quality Control and Standards Department, Woodruff.

Former graduates with the Dunean Group of J. P. Stevens and Company in Greenville are:

Allen Adams '45, Designer; W. S. Armstrong (2 years at Clemson), Planning Department; Furman Bobo '39, General Overseer Planning Departments; A. S. Dargan '49, Assistant Engineer; B. A. Fletcher, '41, Assistant Divisional Supervisor, Wage and Rate Department; Harris Ford '35, Assistant Engineer; W. H. Frick '49, Supervisor Waste Control, Dunean Group; J. L. Gabrels '48, Assistant Engineer; John P. Garrett, Jr., '49, Rate Checker; J. W. Greene, '27, Master Mechanic; I. H. Grimball, Jr., '40, Divisional Cost Supervisor; Joel Earl Hudson, Jr., '48, Spun Rayon Planning; Harry Burn Iler, Jr., '48, Spun Rayon Planning; B. H. Keitt, '39, Quality Control; David Lee '46, Plant Supervisor Wage and Rate Department; B. A. Leppard, '43, Assistant Engineer; Herbert Lindsay, '45, Assistant Divisional Supervisor, Wage and Rate Department; R. F. McNab, '44, Assistant Engineer; Richard M. Montgomery, Jr., '52, Technician; Dan Moyd, '50, Overhauler, Weaving; J. B. Rhame, '47, Planning Department; James Rochester, '51, Technician; William B. Rogers, '48, Laboratory Supervisor; R. E. Shaw, '51, Slasher Tender; William S. Vincent, '48, Yarn Procurement; Charles H. Van Hollen, Jr., '42, Pilot; and Charles D. Willard, '49, Assistant Instrument Man.

With the Dunean Group in other plants are:

T. E. Eskew, '49, Assistant Divisional Supervisor, Wage and Rate Department, Whitmire; William H. Masters, '52, Trainee, Easley plant; Charles L. Rogers, '52, Planning Clerk, Williamston; and W. H. Trammell, Jr., '33, Director of Engineering, Piedmont.

With the Columbia Division of Pacific Mills are:

John T. Wingard, '36, Superintendent Richland plant; Robert G. Sharp, '40, Overseer of Weaving; Francis M. Cureton, '50, Second Hand Weaving; Robert M. Shealy, '51, Laboratory; and James R. Inabinet, '49, Production.

Also employed by Pacific Mills, but now on military leave are:

W. R. Martin, '47, Second Hand Weaving; John B. Lowman, Jr., '47, Second Hand Weaving; and Rudolph Yobs, '50, Apprentice.

The folowing men are employed by Drayton Mills, Spartanburg:

G. G. Simmons, '26, General Manager; J. L. Caldwell, '31, Assistant to Superintendent; M. B. Self, '34, Training Director; J. G. Farrell, '21, Cost Accountant; William K. Lee, '42, Master Mechanic; Carl R. Rogers, '50, Supervisor; Blynn E. Scott, '39, Twister Fixer; and James E. Sammons, 3 years to 1943, Trainee.

With Drayton Mills, on leave for military service are William Bolt, '49, Trainee, and J. W. Lambert, Jr., '52, Trainee.

With Kendall Mills in Newberry is Quay H. Fellers, '50, Assistant Overseer of Weaving.

Clemson graduates with Calhoun Mills, F. W. Poe Manufacturing Division in Greenville are:

James H. Godfrey, '42, Assistant Superintendent; Frank Chalmers, '48, Assistant Overseer of Spinning; J. Albert Edwards, '41, Traffic Department, and James F. Hann, '52, Loom Fixer. At the Calhoun Falls plant are:

Roy B. Toms, '47, Assistant Overseer of Carding; J. P. Parnell, '51, Apprentice, Weaving; Woodford Quinn, '48, Assistant Overseer of Weaving; and J. Willis Hastings, '50, Engineering Deparment.

(continued on page twenty)

INDUSTRY'S PART IN TEXTILE EDUCATION

(continued from page seven)

may stimulate the interest of management throughout the textile industry and of the several textile college faculties to organize themselves together objectively to develop improvements in present day methods of education.

Constructive criticism of the present status of textile education of a necessity must include a reasonably complete and practical plan for developing the desired corrections or improvements. The following suggestions are being offered for consideration:

1. Arrange for conferences between top management groups in the industry and policy making faculty members from individual textile colleges.

These conferences will serve as a medium for the establishment of policies and the allocation of selected key men in the industry to work with various faculty members in the redesigning of courses of study to embrace present day methods, etc.

2. The conferences are to serve all textile colleges by arranging for sectional meetings at each interested college and all benefits are to be shared through the exchange of records of the various meetings.

3. Following the development of specific courses of study, textbooks are to be prepared by the same group or others as desired.

4. Key men actively engaged in manufacturing activities in the mills will be selected to serve with faculty members as associate instructors.

5. One of the most important steps to consider in this program will be the remuneration or salaries to be paid faculty members in the textile colleges. Every effort possible should be exercised in selecting the highest type of instructors. Salaries paid should be not lower than the average superintendent level in the textile industry.

6. Opportunity must be provided for faculty members to spend sufficient time periodically in specific industrial activities to permit their becoming thoroughly familiar with modernized methods.

Sabbatical years should be arranged for the faculty for this purpose.

Again, as suggested in the 1946 conference, I believe much can be gained by:

1. Providing a means for prospective college students to obtain specific placement advice from interested textile key men before selecting their major subjects.

2. Raising the level of remuneration for graduated men employed in the industry to that prevailing in comparable industries in order to encourage students to elect textile college training.

3. Bringing all key men into closer relationship with top management so that students in training may better visualize the opportunities open to them for advancement.

4. Introducing refresher courses to keep all students in training and key men better informed on improved methods in engineering, administration and management.

The combining of forces on the part of manufacturers and educators in this manner is so broad that it is difficult to translate it into single comprehensive program. However, as an example, assume a situation where a high school graduate finds himself interested in attending a textile college, influenced because of his father, any one of his relatives, or a friend who has enjoyed activity in textiles and has been reasonably successful.

This man, after either writing to or calling at the textile college and presenting his credentials, should be advised that arrangements have been made for him to visit a selected textile mill on a certain date and discuss textiles and the many branches of activity with certain mill men specified for such a conference.

The management of the textile mill in question would have subscribed to the plan of meeting with prospective students and have selected certain men in its own organization who were willing to contribute their services in this manner.

The prospective student would be questioned about his own desires and be told of the various major activities in the textile mill operation which he has chosen as his major topic of study. The mill representative should discuss his selection, if one has been made, and if warranted provide an opportunity for the student to talk with inside mill men in the chosen activity.

The mill's report on the young man and his adaptability, either to the activity he had selected or to whatever phase of work they felt he would be best adapted should be sent to the textile college in question.

In a second conference between the student and a member of the college faculty, an intelligent decision could then be made relative to the subjects in which the student should major.

It is reasonable to assume that if this approach were used, a larger number of students would find themselves carrying on with increased interest in the subject in which they majored, during their college years. The plan would also establish a bond between manufacturers and undergraduates in the textile colleges.

While efforts have been made to keep courses of instruction up-to-date, that is, in reasonable accord with the progressive improvements in machinery, methods, etc., in actual experience, however, graduates of textile colleges very often find current practices in the mills in which they are later employed to be quite different from those studied.

There is a definite need for bringing textbooks and general methods of education more in keeping with

conditions which prevail in the industry at the present time.

It is readily appreciated that textbooks and methods of instruction cannot be changed overnight. The rearrangement of methods of teaching and the redevelopment of the subjects to be taught will not be difficult, however, because educators can readily turn to practical mill men and engineers to obtain a full routine of activities practiced in successful mills, and the new textbooks and plan of education be built around this information.

This overall plan as described, provides for modernizing the various courses of instructions and a means by which a student may intelligently select his subject of study throughout his college life, thus improving his acceptability to management after his graduation.

I am concluding my remarks with the same general remarks I used in 1946.

The expanding power of organized labor and more intelligent and keener competition makes progress mandatory in the compensatory realm of good management; for good management stems from good minds, and good minds cannot be allowed to stagnate for lack of fundamental education. The demand for progress holds a test in cooperation. Where the will exists, the textile colleges and practical men in the industry can develop and demonstrate the way for meeting the basic need for better trained minds in the graduates annually made available to the industry.

In conclusion I want to leave with you the resolve which was prepared at the conclusion of the 1946 discussions.

Be It Resolved That Engineers Serving The Textile Industry—

1. Never neglect an opportunity to assist and advise young men interested in obtaining a college education in any of the various branches of the textile industry.
2. Use their influence in the interest of placements for textile college graduates in the textile industry.
3. Endeavor to guide these graduates to activities where their specific education may have the best outlet.
4. Offer service to textile college faculties in the interest of improving and modernizing courses of study.
5. Offer services to assist instructors in class instruction activities.
6. Endeavor to influence textile management to establish sufficiently high levels of remuneration for graduates to attract students to the textile industry and to encourage them to seek for a college education in textiles.
7. Encourage the textile industry to develop methods of employment which will permit students to combine their education with actual practice in their selected courses of study.
8. Bend every effort to interest and influence top policy forming management in the textile industry, to establish scholarships in the textile colleges nearest their own plants.

FIBER RESEARCH AT CLEMSON

(continued from page eight)

scopical features and microscopic techniques for the identification of the newest synthetic fibers and descriptions of modern methods of microscopic investigation of textile fibers. Besides the elementary laboratory course it also includes material for more advanced work which will be of interest in certain phases of industrial research.

Recent research carried out in the field of microscopy by Dr. Heyn is concerned with methods in which polarized light is used; special optical characteristics as birefringence and refractive index were studied using these methods with all new synthetic fibers. The results have been published in a recent article in the **Textile Research Journal.**

Dr. Heyn has been assigned a few students to assist him in his laboratory work. This year he has been ably aided by Rudolph David and Rossie Fowler. Their present work consists of the preparation of microphotographs connected with the microscopic research of fibers, the preparation of x-ray diagrams and the measurements of density of these diagrams. Some chemical work is also on the program for which additional space has been recently arranged.

Dr. Heyn hopes to attract an increasing number of students to do research with him both on graduate and undergraduate levels.

Obtaining Proper Labor Relations

By C. V. Wray, Assistant Professor of Textiles

A friend of mine, a successful textile mill superintendent, once said that his father asked him when he was a boy what he wanted to do when he grew up. He replied that he did not want to be a lawyer, a teacher, a mechanic, a preacher, a salesman, a psychiatrist — that he just did not know. During his years as a supervisor and later superintendent this friend said he found he had to be all these things to run his job properly.

The above is a perfect explanation of what a broad field this article would have to encompass if it were on "Textile Management"—the topic requested by the editor of Bobbin and Beaker.

In order to stay within the allotted space, I will stick to one phase — one very important phase — of Textile Management and that is "Obtaining Proper Labor Relations."

In a mill there is such a thing as getting and keeping the machinery and other equipment in proper condition. There is such a thing as using the right raw material. But to function properly a mill must get machinery, material, and manpower working together. The manpower, or human element, is the big variable of these three—one that is a constant challenge to supervision and management. To meet this challenge proper labor relations between the workers and their supervisors must exist.

Well, you may ask, how can these proper labor relations be brought about? How can the best be obtained from the workers, in terms of effort and cooperation, by supervision? The answers are manifold — so many that each can be touched on only briefly here.

The wage a worker receives is the one most important thing to him. That is why he comes to work in the first place. His pay should be in line with surrounding mill's wage for the same job. His pay in the envelope must be correct to prevent ill feeling.

A worker must be supplied with the proper stock and equipment so that he will be able to earn the wage he is physically and mentally capable of earning.

There always have been, there are now, and there always will be complaints from workers. The good supervisor wants these complaints brought directly to him — not spread among the other workers to breed unrest and grow from something small into something big. These complaints will be brought first to immediate supervision only if they are handled properly by supervision from the start.

Helpful hints in grievance handling are as follows:

Listen carefully to the worker's story. Put him completely at ease by using a friendly tone. Be patient. Do not rush the discussion. The complaint is extremely important to the worker. Treat it that way. Never let the discussion become an argument. Hold your temper by all means. Find out what really is behind the complaint. The stated reason may not be the real basis. Avoid snap judgements. If you are not sure of the facts or answer ask for time to check into the matter. Be sure to come back to the worker with a reply as soon as possible. When you give your decision tell why and how it was reached.

Start new workers out on the right foot. Help them in every way possible to fit themselves to their new jobs. Many mill companies have booklets that are given to new and old workers. These contain pertinent information for the worker and also help him to realize that he is a necessary member of a "team" helping to make a good organization better and by doing so will be helping himself at the same time.

Exercise fair dealings. Let the worker know by example that you are a man of your word, that you will back up what you say to him.

Maintain proper physical conditions such as having a mill that is clean, well lighted, well ventilated and not crowded. These things tend to promote a better worker attitude toward work and company.

Do not issue instructions unless you intend to see that they are carried out. If you do not follow up, then confidence will be lost in your position.

Let the workers see that every effort is being made to insure their safety while on the job.

Make it clear to the worker just who is his immediate boss. A man cannot work for several supervisors at one time.

Let the worker know, by proper planning, just what he is to do at all times. "Hit or miss" supervision and operations bring about "hit and miss" effort.

Do not reprimand a worker in the presence of other workers. All of us have some degree of pride.

Supervisors should show loyalty to the company.

Do not have "pets." Treat all workers and departments on an equal basis.

Supervision can be a give and take position—workers often have good suggestions. Do not ignore these.

Promote competition between workers. This often

brings about closer employee cooperation with supervision, as many workers will want to do all they can to surpass their fellow workers.

Company or department athletic teams give many workers pride in their company or department. They give them a sense of "belonging" even though most workers may not actually participate but merely attend the contests.

Some mills teach workers to read and write if such is needed. This is a clear cut demonstration that the company is interested in the worker's general welfare.

A supervisor should show personal interest in the employees as individuals. Brief chats with the workers as the supervisor walks the job are effective. He should call as many as possible by their first names. Inquiries regarding loved one, hobbies, etc., are helpful. Workers appreciate visits when they are sick. Advice on personal matters is often requested of supervisors. These requests should not be treated lightly.

There is nothing new in all the above. It boils down to the fact that we need to review these things often and keep them in practice to bring about proper worker relations.

In closing—good labor relations are like any other endeavor, one must invest wisely in time, effort, and thought in order to reap desired benefits. These benefits just do not come by chance alone.

DR. W. T. RAINEY, JR.

(continued from page thirteen)

Mr. Rainey came to Clemson in October 1948. He is married and has a daughter two and one half years old.

In addition to teaching, Dr. Rainey is active in the American Chemical Society, The American Camellia Society, Sigma Zi and Kappa Sigma, social fraternity. He is also Scout-Master of the Clemson troop. His hobbies are amateur radio, raising camellias and azaleas.

THE TEXTILE INDUSTRY IN PAKISTAN

(continued from page nine)

be allocated in the near future. There are 333,126 spindles at present in operation, including 177,418 spindles which existed at the time of Partition. It is expected that a further 254,320 spindles will go into production in the course of the current year. The total production at the end of 1951 was recorded at 85,112 bales of cloth and 48,437 bales of surplus yarn. So far as cotton cloth is concerned, Pakistan reasonably hopes to become self-sufficient within the next three or four years.

Wool: Pakistan produces about 30 million lbs. of raw wool but due to the absence of woolen textile mills most of this quantity is exported. For establishing woolen mills in Pakistan, the target in September 1949 was 13,000 spindles for the Punjab, 16,000 for Sind and Karachi, 9000 for the NWFP, and 2000 for Baluchistan. With the establishment of these spindles, the indigenous raw wool will be utilized to meet the local requirements of woolen products.

Since all this industrial development is based on the backing of the respective agricultural products, to quit now would be to tell only half the story of progress unmatched.

Jute: This is the most important cash crop of the country, and the area under cultivation is licensed and adjusted with the fluctuations in demand. The yield for the year 1950-51 was 4,452 thousand bales of 400 lbs. each, from an area of 1,250 thousand acres.

Cotton: Although cotton is grown in more than 60 countries of the world, in seven countries only is its production of any major commercial importance. Pakistan is one of these seven countries, and contributes about 6% of the total world cotton crop. As has already been seen, the domestic consumption of cotton is still very small, consequently most of it finds its way into the international market, making Pakistan the third largest exporter of cotton in the world. Exports in 1950-51 totalled 1,385,000 bales. The present production is of the order of 1.5 million bales.

About 90% of the crop is of the Upland American type. The American varieties are grown under irrigation. The bulk of the crop measures 15/16 inch in staple. However, sizable quantities of 1-1/32 inch are also available for export.

This has been a brief survey of the humble beginnings of a vital portion of industry in general. The picture it presents is of a dynamic economy, constantly on the move and moving faster and faster as the years fall away, one by one. No one claims that these years have been all that one might have wished them to be, but it has been a start.

PHI PSI NEWS

B. E. Wilson, T.E. '54

PHI PSI AWARDS HONORARY DEGREES

Three prominent South Carolinians were awarded honorary degrees by Phi Psi textile fraternity on October 7. The men chosen have been active in the educational, construction, and manufacturing aspects of textiles in the state for some time.

The three men honored were: Dr. Robert F. Poole, president of Clemson College; Charles E. Daniel, president of Daniel Construction Company of Greenville and a member of the board of Trustees of Clemson College; and Charles A. Gibson, president of Poe Manufacturing Company of Greenville and Calhoun Mills of Calhoun Falls, and also president of the South Carolina Textile Manufacturers Association.

Left to Right: C. E. Daniel, Earl Heard, Dr. R. F. Poole, Charles A. Gibson.

The degrees were conferred by Phi Psi president Earl Heard, vice-president and director of research of the West Point Manufacturing Company of Shawmutt, Ala. Mr. Heard was assisted by John T. Wigington, executive secretary of the fraternity and director of technical services for the American Cotton Manufacturers Institute at Clemson. The presentation followed a banquet given by Iota Chapter at the Clemson House.

Phi Psi was established at Philadelphia Textile Institute in 1902. It now has nine active chapters at textile schools in the East and South, and twelve alumni chapters with a combined membership of 3,000.

Eighteen members of the faculty of the Clemson School of Textiles and four others in textile work on the campus belong to the fraternity in addition to top ranking students majoring in the field of textiles.

NEW OFFICERS FOR THE N.T.M.S.

New officers for the National Manufacturing Society were elected at the first regular meeting this year. The new officers elected were Lenard Butler, President, Bryant Miller, Vice President, Jack Crumpton, Secretary, Arthur B. Hair, Treasurer, Claude B. Iller, Corresponding Secretary and Toy Gossett, Publicity Secretary.

N. T. M. S.

At the second regular meeting of N.T.M.S. we were very fortunate to have as guest speaker Mr. Clark Hubbard of the Deering Milliken Company. His talk

CLARK HUBBARD

on the varied phases of industrial engineering instruction given to the trainees of the Deering Milliken Company was both enlightening and instructive to the N.T.M.S. members.

WHERE ARE THEY NOW?

(continued from page fourteen)

With Textron in Anderson are:

John Edward Chambers, '50, Air Conditioning Engineer; Jennings L. Lyons, '51, Draftsman; Robert Gregg, Jr., '50, Plant Supervisor; W. M. Asheley, '49, Assistant Superintendent, Riverside Mill; Tom McClure, '50, Methods and Standards Engineer; Sam Timms, '49, Supervisor Carding; Roderick Todd, '49, Methods and Standards Engineering; James Carroll, '50, Supervisor Trainee; Foster McConnell, '42, Supervisor Finishing Plant; James H. McConnell, '50, Supervisor Trainee; Gerald Carter, '52, Production Planning Department; Charles B. Burnett, '49, Supervisor Cloth Room; and Ralph Fowler, '52, Supervisor Weaving, Southside Plant.

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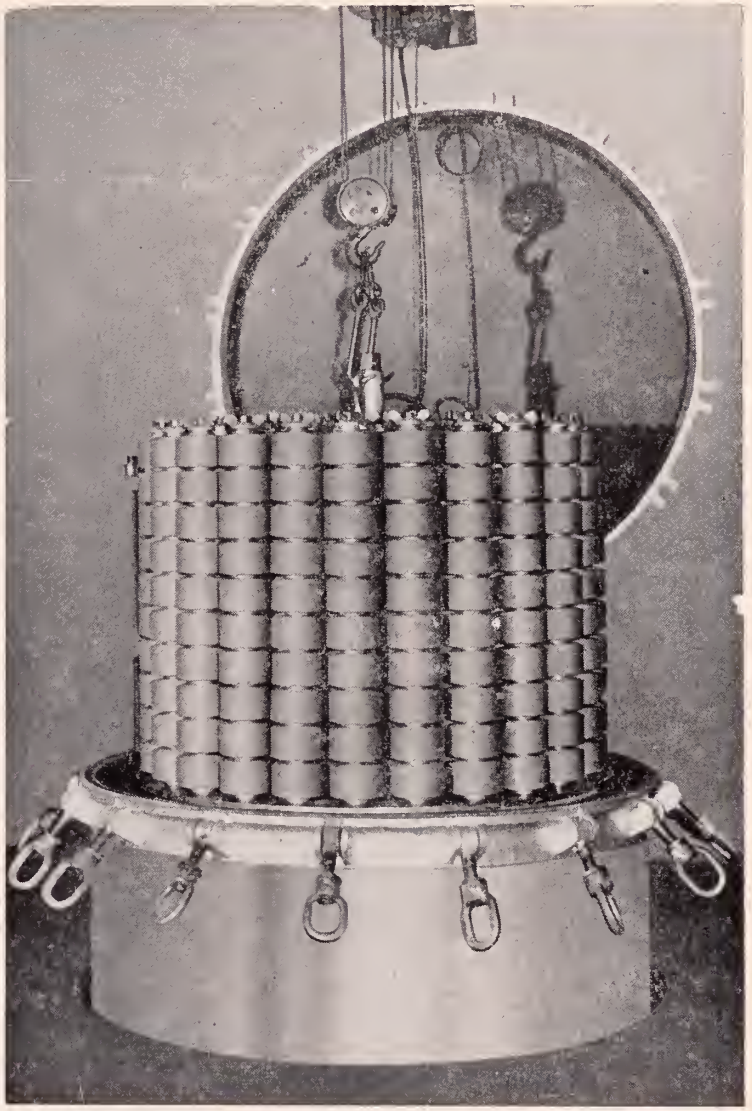

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